

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue Application of:) Atty. Docket: **ICB0166**
Olivier M. PARRIAUX)
Reissue Serial No. 10/803,198) Confirmation No. 4841
Reissue Filed: March 18, 2004)) Group Art Unit: 2877
Original Patent No. 6,359,691 B2)) Examiner: Andrew LEE
Issued: March 19, 2002))
For: DEVICE FOR MEASURING TRANS-)
LATION, ROTATION OR VELOCITY)
VIA LIGHT BEAM INTERFERENCE)

**37 CFR § 1.175 SUPPLEMENTAL DECLARATION FOR REISSUE
APPLICATION**

MAILSTOP: REISSUE

United States Patent and Trademark Office
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

I, OLIVIER M. PARRIAUX, declare as follows:

1. I am a citizen of Switzerland and my residence address and post office address are stated below my signature to this Declaration.
2. I am the named inventor of U.S. Patent 6,359,691 B2 entitled “DEVICE FOR MEASURING TRANSLATION, ROTATION OR VELOCITY VIA LIGHT BEAM INTERFERENCE” (hereafter, the “‘691 Patent”), which issued on March 19, 2002 from U.S. Patent Application Serial No. 09/788,444, filed February 21, 2001 as a continuation of application No. PCT/EP99/06057, filed on August 19, 1999.
3. I am the sole owner of the ‘691 Patent.

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4. I am the original, first and sole inventor of the invention entitled "DEVICE FOR MEASURING TRANSLATION, ROTATION OR VELOCITY VIA LIGHT BEAM INTERFERENCE" (as twice amended), described and claimed in the above-identified '691 Patent, and for which invention I solicit a reissue patent. I have reviewed and understand the contents of the '691 Patent, including the original claims and the new claims 34-43 added in the reissue application, and the original claims as amended by Preliminary Amendment (A) and by Amendment (B) to the reissue application. I am the first and original inventor of the subject matter that is claimed and for which a reissue patent is sought. I do not know and do not believe the same was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year prior to the application for the patent. The invention for which a reissue patent is sought was not in public use or on sale in the United States of America more than one year prior to the application for the patent. The invention has not been patented or made the subject of an inventor's certificate issued before the date of application for the patent in any country foreign to the United States of America on an application filed by myself or by my legal representatives more than twelve months prior to the application for the patent. Lastly, I acknowledge my duty to disclose information of which I am aware and that is material to the examination of this application.

5. I believe the original U.S. Patent No. 6,359,691 B2 to be, through error and without deceptive intent, wholly or partly inoperative or invalid, by reasons of my claiming, in certain respects, more than I had a right to claim in the original patent.

Specifically, I now believe that the descriptive language in claim 1 of the original patent, pertaining to the diffraction of the light beam by the components of the diffraction grating assembly, is overbroad.

6. I believe the original U.S. Patent No. 6,359,691 B2 to be, through error and without deceptive intent, wholly or partly inoperative or invalid, by reasons of my claiming, in certain respects, less than I had a right to claim in the original patent. Specifically, I now believe that I had the right to claim the relative mobile relationship between the first and second grating assemblies as supported in col. 2, lines 25-51, wherein the first grating assembly is broadly mobile relative to the second grating assembly. In particular, when one of these two grating assemblies is arranged in a fixed manner, it could be either the first grating assembly or the second grating assembly that is fixed. In addition, I specifically now believe that I had the right to claim in the original patent not only claims 1-33, which are present in the issued '691 Patent, but also new claims 34-43 included in this reissue application.

7. These errors arose without deceptive intent during the preparation and prosecution of the original '691 Patent. In particular, I did not fully appreciate the breadth of the recitation, in claim 1 of the '691 Patent, of how the fixed reflective grating assembly and the mobile grating assembly "diffract a portion of the incident light beam thereby producing interference and the resultant portion of the incident light beam" that is detected by the light detector. In accordance with all embodiments of the present invention, the recited structures more narrowly result in the incident light beam reaching the first grating assembly where it is partially diffracted along two different directions thereby forming two partial light beams

which then reach the second grating assembly and, thereafter, the first grating assembly, thereby forming, after diffraction by this first grating assembly, the resultant interference beam that results from an interference of the two partial light beams along an output direction.

8. In addition, during the preparation and prosecution of the original '691 Patent, I did not appreciate the unnecessary limiting effect of reciting fixed and mobile grating assemblies in claim 1 of the '691 Patent. Specifically, the broadest embodiment in accordance with the present invention does not require that either the first or second grating assemblies be "fixed," but only that the first grating assembly be mobile relative to the second grating assembly.

9. Also during the preparation and prosecution of the original '691 Patent, I did not realize that a certain embodiment was not included in the claims. Specifically, I did not realize during prosecution that the embodiment wherein the detector and the light source are both integrated in a semiconductor substrate bearing the second grating assembly had not been included in the claims of the '691 Patent.

10. At the time the original '691 Patent was drafted and prosecuted, I had independently engineered my invention. My native language is French. The prosecution of the original '691 Patent proceeded in English through my European Agent, Ingenieurs Conseils en Brevets, S.A. (hereafter, "ICB"), and their American associates. As a result of prosecuting my patent from overseas, a misunderstanding arose as to the scope of the present invention when the claims were redrafted to comply with U.S. standards of definiteness under 35 U.S.C. § 112. The redrafted claims were overly broad in certain respects and overly

narrow in others. These redrafted claims became the claims of the '691 Patent. Had I been aware of and fully understood the scope of the claims newly drafted during prosecution of the original application, I would have directed the patent attorneys to prepare claims of proper scope.

11. Prior to the issuance of the '691 Patent, I did not have the opportunity to review the claims as amended during the prosecution of the original application. Therefore, I did not fully appreciate how the allowed claims had deviated from the scope I had intended.

12. Subsequent to the issuance of the '691 Patent, I had opportunity to review the claims and to study them. During this review, I became aware that the scope of the claims was not as I had intended. After meeting with a member of ICB, it became clear to me that the claims of the '691 Patent were overly broad in certain respects, and too narrow in others. In addition, I realized that the embodiment wherein the light source is integrated in a semiconductor substrate bearing the second grating assembly had not been claimed.

13. I believe that I am entitled to amend the claims of the '691 Patent so as to narrow the scope of the language regarding the diffraction of the incident light beam by the first and second assemblies, and to broaden the scope of the language describing these two assemblies, as are fully supported by the original disclosure of U.S. Application Serial No. 09/788,444, which resulted in the '691 Patent.

14. I believe that I am entitled to make the new claims 34-43 as they are fully supported by the original disclosure of U.S. Application Serial No. 09/788,444, which resulted in the '691 Patent.

15. In my original patent, there is no claim that is of the same scope as any of the amended claims 1-14, 17, 19, 22, 23, 26-28, 30, 32 and 33, and the newly added claims 34-43. The differences in scope are emphasized by showing how each of the amended claims 1-14, 17, 19, 22, 23, 26-28, 30, 32 and 33 differ from the corresponding original claims of the '691 Patent. In addition, the difference in scope between new claims 34-43 and the original claims is emphasized by comparing new claims 34-43 to the original claims 1 through 33 of the '691 Patent. Such comparison, set forth in paragraphs 16 through 30, specifies excesses and insufficiencies of my original patent claims. However, the Examiner is encouraged to compare the language of the original claims with the language of the new claims to fully appreciate all of the differences between the claims.

16. Claim 1, as twice amended, is directed to a device utilizing light diffraction for measuring translation, rotation or velocity comprising a diffraction grating assembly that includes a first reflective grating assembly and a second reflective grating assembly wherein the first grating assembly is mobile relative to the second grating assembly. There is no language to suggest that either the first grating assembly or the second grating assembly is fixed. Original claims 1-33 do not describe this aspect of the invention. In most cases, one of the two grating assemblies is fixed, but which one is not relevant to the invention. However, in a preferred embodiment (i.e., claim 4), the first grating assembly is mobile and the second grating assembly is fixed. So, original independent claim 1 recites a diffraction grating assembly comprising a fixed reflective grating assembly and a mobile reflective grating assembly, which includes a limitation not present in amended claim 1. Claim 1, as twice amended, now incorporates subject matter from previous claim 10 and

recites that the first and second grating assemblies are arranged to diffract at least a portion of the incident light beam so that the incident light beam reaching the first grating assembly is partially diffracted along two different directions thereby forming two partial light beams which reach the second grating assembly, and thereafter, the first grating assembly, thereby forming after diffraction by the first grating assembly, the resultant interference beam resulting from interference of the two partial light beams along an output direction. In contrast, independent claim 1 of the '691 patent does not contain language so narrowly defining the formation of the resultant interference beam.

17. Amended claims 2-4, 8, 13, 14, 17, and 19 each depends upon amended claim 1, and these claims are amended to maintain consistency of language and proper antecedent basis in view of the preceding amendments to claim 1.

18. Amended claims 5 and 9 each depends upon amended claim 4, and these claims are amended to maintain consistency of language and proper antecedent basis in view of the preceding amendments to claims 1 and 4.

19. Amended claims 6 and 7 each depends upon amended claim 5, and these claims are amended to maintain consistency of language and proper antecedent basis in view of the preceding amendments to claims 1, 4 and 5.

20. Amended claim 27 depends upon amended claim 8, and this claim is amended to maintain consistency of language and proper antecedent basis in view of the preceding amendments to claims 1 and 8.

21. Amended claim 11 depends upon amended claim 9, and claim 11 is amended to maintain consistency of language and proper antecedent basis in view of the

preceding amendments to claims 1, 4 and 9.

22. Amended claim 12 now depends upon amended claim 1, and claim 12 is amended to maintain consistency of language and proper antecedent basis in view of the preceding amendments to claim 1.

23. Amended claims 22, 26 and 32 each depends upon amended claim 2, and these claims are amended to maintain consistency of language and proper antecedent basis in view of the preceding amendments to claims 1 and 2. Furthermore, claim 32 has been amended to recite that the first reflective surface is arranged to deviate a first beam originating from the source and propagating substantially along a displacement direction of the second reflective grating. Original claims 1-33 do not describe this aspect of the invention.

24. Amended claim 23 depends upon amended claim 3, and claim 23 has been amended to maintain consistency of language and proper antecedent basis in view of the preceding amendments to claims 1 and 3.

25. Amended claim 28 depends upon new claim 40, and claim 28 has been amended to maintain consistency of language and proper antecedent basis in view of the language recited in new claim 40.

26. Amended claims 29 and 30 have been amended to depend upon new claim 40 instead of claim 26 so as to recite a more fully developed embodiment. Original claims 1-33 do not describe this particular embodiment of the invention.

27. Amended claim 33 now depends upon new claim 43, and claim 33 has been amended to maintain consistency of language and proper antecedent basis in view

of the language recited by new claim 43.

28. New claim 34 depends upon amended claim 6 and recites that the light source is integrated in a semiconductor substrate bearing the second grating assembly. Original claims 1-33 do not describe this aspect of the invention.

29. New claim 35 is an independent claim corresponding to previous claim 6 rewritten in independent form. New claim 36 is an independent claim corresponding to previous claim 7 rewritten in independent form. New claim 37 is an independent claim corresponding to previous claim 15 rewritten in independent form. New claim 38 is an independent claim corresponding to previous claim 17 rewritten in independent form. New claim 39 is an independent claim corresponding to previous claim 18 rewritten in independent form. New claim 40 is an independent claim corresponding to previous claim 26 rewritten in independent form. New claim 41 is a dependent claim corresponding to previous claim 8, but written to depend upon new claim 40. New claim 42 is an independent claim corresponding to previous claim 31 rewritten in independent form. New claim 43 is an independent claim corresponding to previous claim 32 rewritten in independent form. Original claims 1-33 do not describe these particular embodiments of the invention.

30. Further differences between the amended claims 1-14, 17, 19, 22, 23, 26-28, 30, 32 and 33 and the original claims 1-33 will be apparent from a comparison of the language of the twice amended claims with the language of the original claims.

31. As specified in paragraphs 7-15, above, I became aware of the excesses and insufficiencies of my original patent claims in the latter part of 2003 after thoroughly reviewing the claims of the '691 Patent and discussing them with a member of

ICB. At that time I first realized that through error, without deceptive intent, I had claimed in certain respects more than I had a right to claim in my original patent while at the same time I had claimed in other respects less than I had a right to claim.

32. At this time, I wish to clearly express that the scope of the present claims does not cover the embodiments shown in Figures 1 to 4 and Figure 8 of the '691 Patent. On the other hand, I believe that the scope of the present claims does cover the embodiments illustrated in the remaining figures of the '691 Patent. More particularly, Figure 1 illustrates, for example, a first diffraction grating (6) that is transmissive and not reflective. Transmissive diffraction gratings for the first and second gratings are not covered by the scope of the presently claimed invention. In contrast, the scope of twice amended claim 1 covers, *inter alia*, the embodiment shown in Figure 17 because first grating (90) and second grating (92, 92') are reflective gratings. The further transmissive grating (140) in this embodiment is associated with the source for generating incident beams FI and FI'.

33. However, the embodiment shown in Figure 5, for example, is covered by the scope of the present claims because the first and second diffraction gratings (62) and (70) are reflective diffraction gratings and are not transmissive diffraction gratings. This feature of the present invention, wherein only reflective diffraction gratings are used for the first and second gratings, is important because non-transmitting diffraction gratings (*i.e.*, reflective diffraction gratings) can easily be made of silicon, which facilitates miniaturization and integration.

34. As shown in Figure 7 or 9, for example, the present invention permits the light source (72), the detector (74) and the second reflective diffraction grating (90) to be

compactly manufactured as one small assembly located on one side of the scale (i.e., first reflective grating (62)), thereby permitting advantageous miniaturization and integration. The reason that integration can be achieved is because silicon can be used to make the reflective diffraction grating (92). The reason that silicon can easily be used to make the grating is because the diffraction grating does not have to be transparent to the light of the incident beam. Silicon is not transparent to light with a wavelength essentially smaller than one micrometer so transmissive gratings cannot be implemented in the same silicon substrate as a preferred detector, which is functional only for wavelengths essentially smaller than one micrometer.

35. As shown in Figure 5, for example, a further advantage of the first and second reflective gratings is that the second grating, which may have a relatively smaller pitch presents a relatively short length, and the mobile scale formed by the first grating is easier to manufacture than the second grating because of its relatively larger pitch.

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36. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed by me to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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